# TECHNICAL SPECIFICATIONS

# WASHINGTON STATE FERRIES

# M.V. HYAK DRYDOCKING

# CONTRACT NO. 00-7037

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# TECHNICAL SPECIFICATION

**For the following Technical Specifications, the Contractor is to provide all labor, material and equipment to accomplish each and every Bid Item unless otherwise specified.**

**The Specification Item sub-titles in brackets are for WSF internal use only, for Life Cycle Cost modeling. Bidders should ignore such bracketed sub-titles.**

## 1. DRYDOCK VESSEL
**{MAINTENANCE}**

**M.V. HYAK Vessel Particulars:**
Length: 382'-2", Beam: 73'-2", Draft: 18'-6", Gross Tons: 2,704.

A. Drydock Vessel for cleaning, painting, inspections, the Work specified herein, and any necessary repairs.

B. Block spacing shall be at 12-foot centers. Within twenty-four (24) hours of docking, provide three (3) copies of the block position drawing to the WSF Inspector indicating the block positions used.

C. Vessel shall be blocked to expose the previous docking block positions. **Attachment No. 1**, "Block Position Form", showing previous blocking position is provided.

## 2. TEMPORARY SERVICE
**{MAINTENANCE}**

A. Install one (1) telephone on board in a location designated by the Vessel Staff Chief Engineer. The telephone is to have one (1) outside line with toll-free access to Seattle and vicinity and, if different, one (1) line for local numbers. The telephone shall have touch-tone service if available from the Contractor's telephone system.

B. Provide and maintain electricity, water, safe lighted gangway and trash removal services while Vessel is in the Contractor's facility.

C. Provide Safety and Security for the entire Vessel throughout the construction, repair or preservation period until such time as the WSF has accepted redelivery of the Vessel. Every reasonable precaution shall be taken to protect the Vessel from the hazards of fire, flooding, pilferage, malicious damage, and other events including cataclysmic phenomena of nature.

D. Provide and maintain comprehensive and effective fire prevention and fire detection, and fire fighting programs and systems sufficient to ensure the safety and integrity of the Vessel. Provide personnel trained in shipboard fire fighting techniques and also trained to cooperate with and assist local fire fighting organizations. Provide sufficient shore fire lines to ensure an adequate supply of fire fighting water, at sufficient pressure, and maintain an adequate number of tested fire-hoses aboard the Vessel to effectively fight fires at any location in the Vessel.

E. Provide and maintain portable fire extinguishers in sufficient quantity, and of the appropriate type, to combat local fires of any class. Provide sufficient fire watches, including roving watches as may be required, to ensure that fires that may be inadvertently started by welding sparks or heat, electrical malfunction, or spontaneous combustion are detected, reported and promptly extinguished.

## 3. SEA CHEST AND TREATMENT TANK ANODE INSPECTION {MAINTENANCE}

A. Open the four (4) anode covers located on top of the sea chests for inspection by the WSF Inspector and the Vessel Staff Engineer. (The covers weigh approximately 150 lbs. each and requires that two (2) electrical leads each be disconnected prior to anode removal and reconnected upon installation of the new anodes). Units are located ahead of the sea valves, two (2) per engine room. Protect deck from damage during this work Item.

B. Remove existing anodes and install new WSF supplied anodes. Close up access plates using new gaskets, and grommets. The removed anodes will place on the Vehicle deck and remain property of WSF.

C. Prior to installing the new anodes, prepare the access cover plates, including the surface where the anode covers mount, to an SSPC-SP3 Power Tool Cleaning, and apply two (2) coats of INTERNATIONAL Intertuf 262 series Epoxy, 5 mils (DFT) each coat, for a total of 10 mils (DFT).

## 4. SEA VALVE INSPECTION
**{MAINTENANCE}**

A. Open the below listed sea valves that are larger than two inches (2") and clean for inspection. Check valve disc to valve seat contact for proper seating using Prussian blue. All valves shall be inspected by the WSF and USCG Inspectors, and the Vessel Staff Chief Engineer prior to cleaning bluing off and closing up valves.

B. Furnish and install new U.S.C.G. approved sea valves for valves two inches (2") or less. New valves shall be hydro tested in the presents of the WSF Inspector prior to installation.

| QTY | SERVICE | SIZE | TYPE |
|---|---|---|---|
| 4 | Main sea valves | 10" | gate |
| 4 | Main engine cooler overboard | 5" | gate |
| 4 | Main Engine checks in voids | 5" | check |
| 2 | Ship service generator overboard | 3" | gate |
| 2 | Check valves in voids | 3" | check |
| 1 | 100 KW generator overboard | 2'' | check |
| 1 | 100 KW generator overboard | 2'' | globe |
| 2 | Fire pump overboard discharges | 4" | gate |
| 1 | Engine Room Bilge Pump overbd. | 4" | gate |
| 1 | Check valve in void | 2" | check |
| 2 | Fire pump Overboards in void | 4" | check |
| 4 | Sea chest vents | 1½" | gate |
| 2 | Fire pump emergency bilge suction | 6" | globe |
| 1 | Fire pump independent bilge suction | 5" | angle globe |

C. Sea valves shall be inspected by the WSF and USCG Inspectors for the following:

1) General material condition.

2) Valve disk to valve seat contact.

3) Proper mechanical operation.

D. After inspection, reassemble/install valves using new valve stem packing and new gaskets on all valve flange connections affected by this work.

## 5. RUDDER INSPECTION, NO. 1 AND NO. 2 ENDS
**{MAINTENANCE}**

A. Erect and remove staging or provide suitable personnel lifting device on both sides of No. 1 and No. 2 End Rudders to accomplish all affiliated work required and inspections. Drain both rudders into a container and properly dispose.

B. Conduct a satisfactory pressure test for leaks in the presence of the WSF and USCG Inspectors and the Vessel Staff Chief Engineer. Pressure test will consist of using 42-inches of water with Manometer or 1.5 PSI on acceptable calibrated pressure gauge that has 1.5 at mid scale range. Accepted test is no leaks for One Hour. Submit three (3) copies of a written report of findings to WSF Inspector within twenty-four (24) hours of test results.

C. Take and record clearances of rudder pintle and rudder stock bearings on No. 1 and No. 2 End Rudders.

D. Open the Vehicle Deck cover plates on the upper Rudder Stock Bearing and take clearances. Close up cover with new countersunk stainless steel sockets head cap screws and new gaskets. Submit three (3) copies of a written report of findings to WSF Inspector within twenty-four (24) hours of taking readings.

E. Remove all packing from both rudder stocks, clean and inspect packing glands.

F. Reassemble packing glands using new WSF furnished packing.

G. Remove and replace five (5) broken packing gland studs and nuts on each end, using material in-kind to the existing.

## 6. PROPELLER INSPECTION, NO. 1 AND NO. 2 ENDS
**{MAINTENANCE}**

A. Erect staging in area around No. 1 and No. 2 End Propellers to accomplish all affiliated work required, and inspections. Remove staging upon completion of all affiliated work.

B. Polish the No. 1 and No. 2 End Propellers by power disk sanding using 80 grit or finer abrasive. Thoroughly clean propeller blades and hub for nondestructive testing.

C. Provide labor, materials and equipment to remove No. 1 and No. 2 End Propellers and transport to/from SOUND PROPELLER SERVICES, or ROLLS ROYCE. COMMERCIAL MARINE INC. for inspection and repair (to include NDT, pitch, static balance, etc.) and reinstall. Reinstallation taper fit and nut hardening to be witnessed by the Staff Chief Engineer, and USCG and WSF Inspectors. Measure and record “draw up” position of propeller, prior to removal for reference at reinstallation. Conduct a magnetic particle inspection of the propeller shaft taper and keyway. Repairs to propellers will be the subject of a change order.

D. Submit three (3) copies of a written report of the findings to the WSF Inspector.

## 7. VOID TANK INSPECTION
**{MAINTENANCE}**

A. Provide the services of a marine chemist to certify voids "SAFE FOR WORKERS TO ENTER". The Vessel's crew will open the 32 manholes. Vessel’s crew will close up the manholes using new, Contractor furnished, gaskets and cotton grommets.

## 8. BOILER HOT WELL ASBESTOS ABATEMENT
**{MAINTENANCE}**

A. GENERAL:

1. The Work Item describes removal of asbestos insulation from the boiler hot well, boiler exhaust stacks, boiler main steam lines and the reinsulation of the them with none asbestos material.

B. The removal of the existing Asbestos material shall be accomplished by licensed personnel in accordance with current state and federal environmental regulations. All removed materials shall be disposed of in accordance with current Federal, State, and Local regulations.

C. The removal shall include all Asbestos;

1. From the hotwell and all piping connected to the tank.
2. From the main steam stops outward approximately thirty feet (30’).
3. From the exhaust joint at the boilers outward to where the piping vertical.

D. Install new non-ACM insulation with the same insulating properties and US Coast Guard Approved. New insulation shall be sealed to prevent infiltration of oil or water.

E. Remove and reinstall all interferences necessary to complete the work.

## 9. AUDIO GAUGE TREATMENT TANKS
**{STEEL REPLACEMENT}**

A. Coordinate the Audio Gauging Treatment tank and anode inspection.

B. Perform an ultrasonic survey of the Vessel's steel plating thickness on the saltwater treatment tanks. The survey shall be done on all sides and the top on a 6" grid pattern. The survey shall be performed in the presence of the WSF and USCG Inspectors. Estimate 150 shots will be required.

C. The readings shall be taken from the exterior of the tank when the Vessel is in Drydock. The exact areas to be surveyed will be designated by the WSF Inspector. The readings may be taken through the paint in areas of smooth surface if equipment is capable. In areas disturbed by this work, remove and restore paint as necessary, using the proper coating system.

D. Provide the WSF Inspector with three (3) written copies of the report in a tabular form, identifying the locations of reading by location, original plate thickness, audio gauge reading taken, and percent of wastage. Attach a schematic showing the locations where the shots were taken and the thickness found.

E. Repair any paint coating damage as required.

## 10. SALT WATER PIPING IMPRESSED CURRENT SYSTEM RENEWAL
**{MAINTENANCE}**

A. GENERAL:

1. The Work Item describes the renewal of the Salt Water Impressed Current System Controller and modification of the wiring.

2. The renewal of the Salt Water Impressed Current System Controller, shall be accomplished in accordance with this specification and the following drawing:

Sketch 001 Hyak SWTT System

Sketch 002 Hyak Sea Chest SW TRTMT

Sketch 003 Hyak Heat Exchanger

B. Remove the existing Impressed Current Controller as **Category D** and replace it with the new, WSF Furnished MARELCO Controller.

C. Note and map the location of all interferences prior to removal of the Controller. Remove all necessary interferences and reinstall on completion of work. Protect all areas in the vicinity of hot work. Moved and/or reinstalled interferences will be re-insulated and preserved in same manner as original installation.

D. Disconnect all ship's wiring from the existing Controller. Carefully document all connections. Protect cables from damage during the removal and installation of the new Controller. Reconnect all cabling to be retained as shown on Sketch 001,Sketch 002 and Sketch 003.

E. Install new stainless steel junction boxes with water tight covers and watertight cable entry points, and terminal strips as shown on Sketch 001 and Sketch 002, exact locations to be determined by the Staff Chief Engineer.

F. Remove existing cables from the location of the new junction boxes to the end Items.

G. Install new cable from the junction boxes to the end item as shown on Sketch 001 and Sketch 002.

H. Remove the existing controller foundation as **Category "D".**

I. Fabricate and install a foundation to land the new Controller.

J. Modify as necessary the existing wire ways for the new cable runs.

K. Megger test and continuity check all new and reused cable associated with Work under this Contract provide the results to the WSF Inspector.

**NOTE:**

All cabling requirements, procedures, and installation shall meet the requirements for cabling as set forth in **Attachment No. 2,** WSF Dwg. No. 8201-652-059-01, Titled, M.V. Hyak, Potable Water Vent Modifications of this Specification.

L. Prepare all areas of new installation and damaged paint affected by this Item, to SSPC-SP 3, Power Tool Cleaning. Coat all prepared surfaces with INTERNATIONAL, Intertuf 262 a minimum of 6 mils (DFT). Use INTERNATIONAL, Intertuf 262 to a minimum of 5 mils (DFT) on all edges. Apply a minimum of 2 mils, (DFT), of INTERNATIONAL, Intercare 755 finish coat to match surrounding color.

M. Replace all disturbed structural, thermal, and acoustical insulation to match original installation.

N. Verify that all installed systems operate as intended. This includes all system components, all safety devices, and all alarms, monitoring, and control devices.

O. The installation/operational testing of the completed system shall include, but not be limited to, the following:

1. Verify that the Controller installation hook-up is in accordance with the Technical Specifications and sketches.

2. Check availability and marking of components in accordance with the relevant sketches.

3. Verify the wire size and wire markers of all installed wires and cables.

## 11. UNUSED OVERBOARD DISCHARGE REMOVAL
**{MAINTENANCE}**

A. GENERAL:

1. The Work Item describes the removal of the Weather Deck Drains, Sewage, thrust bearing cooling overboard discharge nozzles and the modification of the six inches (6") Potable Water Tank Vent.

2. The removal of the Weather Deck Drains, Sewage, thrust bearing cooling overboard discharge nozzles and the modification of the six inches (6") Potable Water Tank Vent, shall be accomplished in accordance with this specification and the following drawing:

WSF Dwg No. 8201-652-059-01

B. Remove nozzles for the eight (8) 2" weather deck drains and their overboards on the lower vehicle deck located inboard of the port and starboard casings, approximately FR 12 & 24 (P/S both ends) shall be removed in their entirety.

C. Insert the shell in way of the removed nozzles.

D. Remove nozzles for the three inches (3") Sewage overboard approximately FR 23 Port side No. 2 End.

E. Remove nozzles the two (2) thrust bearing saltwater cooling overboards and the associated piping approximately FR 39 Port side No. 2 End and FR 30 Starboard side No.1 End.

F. The shell insert shall be of the same thickness and material type as the existing shell. The USCG Inspector and the WSF Inspector shall approve the insert size and configuration. All welding will comply with USCG and WSF standards. Insert plates have been fabricated and are onboard the Vessel.

G. Modify the six inches (6") Potable Water Tank vent located in Engine Room 2 in accordance with WSF Dwg No. 8201-652-059-01 to clear and existing shipping hatch.

H. All hot work to the shell plating shall be completed prior to coating hull.

I. Prepare all areas of new installation and damaged paint affected by this Item, to SSPC-SP 3, Power Tool Cleaning. Coat all prepared surfaces with INTERNATIONAL, Intertuf 262 a minimum of 6 mils (DFT). Use INTERNATIONAL, Intertuf 262 to a minimum of 5 mils (DFT) on all edges. Apply a minimum of 2 mils, (DFT), of INTERNATIONAL, Intercare 755 finish coat to match surrounding color.

J. Replace all disturbed structural, thermal, and acoustical insulation to match original installation.

K. Conduct an appropriate test of the shell insert as required by the USCG Inspector.

## 12. TOPSIDE SURFACE SPOT PREPARATION AND COATING {STRUCTURAL PRESERVATION}

A. Prepare areas of corrosion and abrasion on the upper and lower vehicle lanes, Port and Starboard curtain plate inboard surface areas including outboard machinery casing and overhead, center vehicle deck area including casings, overhead, and Curtain Plate green stripe to an SSPC-SP 3, Power Tool Cleaning. Areas to be prepared will be identified by the WSF Inspector.

B. Areas prepared in paragraph A of this Item will be coated with two (2) coats of INTERNATIONAL Intertuf 262 series Epoxy, 5 mils (DFT) each coat, for a total of 10 mils (DFT).

C. Apply a topcoat of INTERNATIONAL Intercare series at a minimum of 2 mils (DFT) to match existing color for the area.

**NOTE:**

For bidding purposes, assume that a total of **1,500 square feet**, in various areas will require preparation and painting. Upon completion of the preparation and painting, the Contract will be adjusted upwards or downwards to account for the actual area authorized by the WSF Inspector.

## 13. FRESH WATER WASH {MAINTENANCE}

A. Within twenty-four (24) hours upon drydocking the Vessel, perform a Low-Pressure Water Cleaning (LP WC) at 3,000-3,500 PSI in accordance with SSPC-SP 12/NACE 5. The wand shall be held no more than twelve inches (12") from surface being washed. The entire hull from the guard to the keel, including all horizontal and vertical surfaces of the guard, flat keel, rudders, sea chests and propellers shall be washed. The wash shall leave no visible growth or residue after the hull dries from washing.

B. Remove sea chest strainer plates prior to pressure wash and reinstall strainer plates upon completion of hull painting.

## PAINTING OF VESSEL AND HULL PRESERVATION

### Special Note

### (ATTACHMENT NO. 1)

**Area Preparation, Surface Preparation, Grit Blasting, Paint Coatings, and Inspection for Vessel's hull, curtain plates, casing and super structure shall be in accordance with Washington State Ferries' Marine Coating Specification 1/03 unless otherwise specified in the following Specifications.**

## 14. PREPARATION OF VESSEL HULL FOR GRIT BLASTING {STRUCTURAL PRESERVATION}

**NOTE:**

**Care shall be taken to avoid damage to the "Capac" anodes and reference cells. The anodes are located at frame 54 port and starboard, both ends, nine feet (9') above the keel. The reference cells are located on the Starboard side toward the No. 1 End and Port side toward the No. 2 End.**

A. Install protective covering on propellers, propeller bearings, exposed shafting, CAPAC anodes and reference cell, all through-hull penetration and entranceways to protect and prevent grit blast material from causing damage or entering Vessel.

B. Blank the main sea suction openings from the inside while the valves are removed for maintenance, so the valve mounting flange may be painted on the inside diameter (ONLY WHEN REMOVED FOR SEA VALVE INSPECTION or Replacement).

C. Conduct a pre-blast inspection with the WSF Inspector and the Vessel Staff Chief Engineer.

## 15. GRIT BLAST HULL, BELOW WATERLINE {STRUCTRUAL PRESERVATION}

A. Grit blast the entire hull from the top of waterline (top of Boot Topping) to the keel, including flat keel, all horizontal and vertical surfaces of the guard, sea chests, strainer plates and rudder including areas of capastic to SSPC-SP 6, Commercial Blast Cleaning.

**NOTE:**

**ULTRA HIGH PRSSURE WATER BLASTING WILL NOT BE PERMITTED** as a substitute for grit blasting. It is WSF intent to provide a surface profile on this hull.

B. Prior to commencement of blasting, map area of capastic.

## 16. GRIT BLASTING HULL, ABOVE WATERLINE
**{STRUCTURAL PRESERVATION}**

**NOTE:**

For purpose of bidding, assume that **3,000 square feet** of the hull above the waterline will require painting. The Contract will be adjusted upward or downward using the square footage determined by the WSF Inspector.

A. Grit blast areas of abrasion, corrosion or steel repairs on the hull from the top flat surface of the rub rail down to the waterline (top of Boot Topping) to SSPC-SP 6, Commercial Blast Cleaning, as authorized by the WSF Inspector.

## 17. CAPASTIC RENEWAL
**{STRUCTURAL PRESERVATION}**

A. Renew the entire capastic area around the CAPAC anodes using 'Capastic' epoxy-troweling compound made by ELECTROCATALYTIC, INC. The area shall be the same as mapped at removal. The capastic shall be applied to a minimum thickness of 1/8 inch in the area of the shield out from the faired in area around the anode. Capastic shall be troweled so as to achieve a smooth overall surface.

B. Build up a minimum of 22 mils (DFT) of epoxy Anti-Corrosion Coating over the renewed capastic areas and the secondary dielectric shield areas prior to top coating with Anti-fouling.

## 18. PAINTING OF VESSEL UNDERWATER HULL, ANTI - CORROSION COATING
**{STRUCTURAL PRESERVATION}**

**NOTE:**

For bidding purposes, the entire underwater hull below the waterline will require the **ANTI-CORROSION COATINGS**.

A. Furnish and apply one (1) coat of INTERNATIONAL Intertuf 262 Series epoxy, Red, to a minimum of 5 mils (DFT) to grit blasted areas.

B. Furnish and apply one (1) coat of INTERNATIONAL Intertuf 262 Series epoxy, to a minimum of 5 mils (DFT), of contrasting color to areas painted in this Item.

**NOTE**:

Colors shall be of contrasting color to anti-fouling paint colors.

**19. PAINTING OF VESSEL HULL, BELOW WATERLINE ANTI - FOULING FIRST COATING**
**{STRUCTURAL PRESERVATION}**

A. Furnish and apply one (1) coat of INTERNATIONAL Interviron anti-fouling, BRA Series epoxy, anti-fouling to a minimum of 5 mils (DFT) to all surfaces prepared above.

**20. PAINTING OF VESSEL HULL, BELOW WATERLINE ANTI - FOULING SECOND COATING**
**{STRUCTURAL PRESERVATION}**

A. Furnish and apply one (1) full coat of INTERNATIONAL Interviron anti-fouling, BRA Series epoxy, Black, anti-fouling to a minimum of 5 mils (DFT) to all surfaces below the waterline.

**21. DRAFT, HULL AND RUDDER MARKINGS**
**{STRUCTURAL PRESERVATION}**

A. Paint all draft, hull and rudder marks using INTERNATIONAL Intergard Epoxy Acrylic FT Series, White.

**22. PAINTING OF VESSEL HULL, ABOVE THE WATERLINE ANTI - CORROSION COATING**
**{STRUCTURAL PRESERVATION}**

**NOTE:**

For purpose of bidding, assume that **3,000 square feet** of the hull above the waterline will require painting. The Contract will be adjusted upward or downward using the square footage determined by the WSF Inspector.

A. Furnish and apply one (1) coat of INTERNATIONAL Intertuf 262 series epoxy, to a minimum of 5 mils (DFT) to grit blasted areas.

B. Furnish and apply one (1) coat of to a minimum of INTERNATIONAL Intertuf 262, to a minimum of 5 mils (DFT), of contrasting color to areas painted above in this Item.

## 23. PAINTING OF VESSEL HULL ABOVE THE WATERLINE, TOP COATING
**{STRUCTURAL PRESERVATION}**

A. Furnish and apply one (1) coat of INTERNATIONAL Intergard epoxy FT Series, Medium Green, to a minimum of 2 mil (DFT) to all surfaces.

## 24. PAINTING OF VESSEL GUARD
**{STRUCTURAL PRESERVATION}**

A. Apply one (1) coat of INTERNATIONAL Intertuf 262, Series epoxy, Black, to a minimum of 5 mils (DFT) to the entire guard.

**( END )**